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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,157	04/08/2004	Dong-woo Lee	249/459	7040

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LEE & MORSE, P.C.
1101 WILSON BOULEVARD
SUITE 2000
ARLINGTON, VA 22209

EXAMINER

FORD, JOHN K

ART UNIT	PAPER NUMBER
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3753

DATE MAILED: 03/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/820,157	Applicant(s) LEE ET AL.	
	Examiner John K. Ford	Art Unit 3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/22/05.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18, 21 and 22 is/are pending in the application.
- 4a) Of the above claim(s) 6, 8, 14, 15, 17 and 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 9, 10, 16, 21, 22 is/are rejected.
- 7) ☒ Claim(s) 11-13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 4/8/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/11/05 + 8/23/04</u> | 6) <input type="checkbox"/> Other: _____ |

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Applicant's response of December 22, 2005 has been carefully considered.

Applicant's election of the species of Figure 7 without traverse is acknowledged.

Applicant has identified claims 1-5, 9-13, 16, 21 and 22 as readable on the elected species. Accordingly, claims 6-8, 14, 15, 17-20 are withdrawn from consideration at this time or have been cancelled.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 3, 9, 10, 16 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Komino (JP 5-315293) and Shlosinger (USP 3,543,839) and optionally Oi (JP 8-29080).

Komino in Figure 5 shows a heat pipe (40A), a wafer W, a heater (24), a wick (96), a predetermined amount of working fluid (42), a cooling system (in the vicinity of and surrounding elements 44 and 40c) and connection pipes (122 and 124). No valve is shown in either of the connection pipes.

Shlosinger teaches in a heat pipe structure identical to the one shown in Figure 5 of Komino, the advantage of using a valve (26 or 78) in the connection pipe between the evaporator section (corresponding to 40A of Komino) and the condenser section (corresponding to 40c of Komino) for the purpose of allowing improved control of the heat pipe.

To have used a valve in Komino, in the connection pipe (124) between the evaporator section (40A of Komino) and the condenser section (40c of Komino) for the purpose of allowing improved control of the heat pipe would have been obvious in view of the teaching of Shlosinger. Such a modification would, for example, advantageously reduce heat transfer from the heater 24 to the heat sink 44 during wafer baking modes when no cooling of the wafer is necessary, thereby advantageously saving on the amount of cryogen 44 needed to operate the device.

Regarding the limitation that the entire inside of the evaporator section (40A) of Komino be covered with wick material this is deemed to be fairly taught by both Komino (the entire document) and Shlosinger (the entire document) and if need be by Oi, Figures 5 and 6. Such wicking over all sections of the evaporator advantageously distributed liquid evenly so that there are no "hot-spots".

Claims 4, 5 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over over the combined teachings of Komino (JP 5-315293) and Shlosinger (USP 3,543,839) and optionally Oi (JP 8-29080) as applied to claim 3 above, and further in view of JP 2-126049.

JP '049 teaches two valves 16 and 17 in the respective connection pipes between the evaporator and condenser of a loop-type heat pipe such as shown in Komino. Such a set of two valves would more positively cut-off undesirable flow between the evaporator and condenser than would the single valve of Shlosinger and would have been obvious to have used in Komino to take advantage of that improved

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ability to cut-off flow. Such a modification would, for example, advantageously reduce heat transfer from the heater 24 to the heat sink 44 during wafer baking modes when no cooling of the wafer is necessary, thereby advantageously saving on the amount of cryogen 44 needed to operate the device.

Claims 1, 2, 3, 4, 5, 9, 10, 16, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Komino (JP 5-315293) and Kawai (JP 5-99580) and optionally Oi (JP 8-29080).

Komino in Figure 5 shows a heat pipe (40A), a wafer W, a heater (24), a wick (96), a predetermined amount of working fluid (42), a cooling system (in the vicinity of and surrounding elements 44 and 40c) and connection pipes (122 and 124). No valve is shown in either of the connection pipes.

Kawai in Figure 7 teaches, in a heat pipe structure identical to the one shown in Figure 5 of Komino, using two ^{check}valves (7), one in each of the connection pipes between the evaporator section 4 (corresponding to 40A of Komino) and the condenser section 5 (corresponding to 40c of Komino) for the purpose of allowing improved control of the heat pipe by ensuring circulation in only one direction (i.e. no reverse flow).

To have used two such check valves in Komino, one in each of the connection pipes (122 and 124) between the evaporator section (40A of Komino) and the condenser section (40c of Komino) for the purpose of allowing improved control of the heat pipe would have been obvious in view of the teaching of Kawai. Such a


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modification would, for example, advantageously prevent the device from starting up with the working fluid flowing in the wrong direction.

Regarding the limitation that the entire inside of the evaporator section (40A) of Komino be covered with wick material this is deemed to be fairly taught by Komino (the entire document) and if need be by Oi, Figures 5 and 6. Such wicking over all sections of the evaporator advantageously distributed liquid evenly so that there are no "hot-spots".

Claims 11-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication should be directed to John K. Ford at telephone number 571-272-4911.



John K. Ford
Primary Examiner